

Project Notes

Note No. 8
May
1998

Assessing the Market for Urban Environmental Services: Demand, Preference and Willingness to Pay

It is routine to assess the market demand for any commercial or industrial product before its introduction and over its lifetime. Yet this has not been true for urban environmental services, which have been regarded as essential public goods. Rational planning of infrastructure investments, however, must be based on an informed understanding of the market -- consumer demand, preference and willingness to pay. And as cities begin to turn to the capital market for financing of infrastructure, the related issues of appropriate pricing and cost recovery become increasingly important. This Project Note offers a framework for rapid assessment of the market for infrastructure services which can be applied in the pre-feasibility phase of project development.

The Need for Market Assessment

Rational planning of infrastructure and services must be based on informed understanding of the market for these services. While many services are seen in the 'merit good' category, it is essential to understand user preference and willingness to pay, to maximize both effectiveness and efficiency. New modes of infrastructure finance now being explored in the wake of financial reforms in India demand, in turn, appropriate pricing and cost recovery for these services.

Market assessment focuses on the services which flow from infrastructure and not the facilities themselves. In other words, it focuses on the outputs, not the process. Therefore, in addition to water supply and solid waste management services, the market for treated water effluent and solid waste disposal systems also must be assessed because these produce revenues which help finance the infrastructure.

Traditionally, the market for urban services has not been the subject of assessment because these have been regarded as essential public goods. Further, many of

these services are natural monopolies and therefore lack market alternatives. However, recent advances in contingent valuation methods and hedonic analysis, as well as the emergence of private markets in many cities in response to inadequate services, are helpful in developing market assessment methodologies.

In light of these factors, a market assessment for the service in question is essential. The framework presented here focuses on the market for water supply services. This assessment will help to identify the type of service improvements which are preferred by different user groups, their ability and 'willingness to pay' for services, and will provide guidelines for tariff setting and likely effective demand at different price levels.

Focus on Demand

It is common to find some notion of demand assessment in any report on a water supply project. In most cases, however, this is essentially an assessment of

FIRE(D)

water requirement using prevailing norms and local consumption patterns. While this could be a good starting point, it ignores preferences and willingness to pay of different user groups and related quantity implications. Very often this approach tends to suggest very high levels of shortages without a clear indication of economic viability.

At the same time, most attempts to improve water supply have focused on subsidization, based on the assumptions that households are too poor to pay for water and that to achieve equity, government funds must be spread fairly and, thus, thinly. On the other hand, some international institutions have argued that even the poor can pay 3-5% of their incomes for water supply. This focus on supply has failed to solve the problem, and future research and planning should be grounded in a better understanding of demand — what consumers want and are willing to pay for. A number of research studies have investigated the determinants of demand — such as socio-economic background, char-

acteristics of the existing system, price, distance and reliability — with surprising findings. Some of these studies are described in Box 1.

Market assessment for urban services is not common in India, and a systematic approach incorporating basic economic concepts has not been developed. The following approach combines relevant theoretical concepts with the practical needs of planners and decision-makers regarding investment decisions and price setting. This approach reflects a Rapid Assessment which may be conducted as part of Project Pre-Feasibility Analysis, as developed by the FIRE(D) Project; more detailed assessment would be essential at a later stage.

1. Identify Consumer Groups. The following criteria are suggested.

Price Elasticity of Demand for Services. For example, for many industrial and commercial users, as well as upper income households, the price elasticity will

Box 1: The Impact of Willingness-to-Pay Studies

Willingness-to-pay studies can have important impacts on public sector planning and decision-making, as the following cases demonstrate.

A 1993 study in rural Kerala used contingent valuation method to test the sensitivity of households to the monthly tariff for water from a yard tap compared to the higher cost of a household connection with improved quality.¹ The contingent valuation method allowed respondents to consider hypothetical changes, and the study found that the real constraint to providing household connections was not the high cost but the limited availability of local credit.

A 1990 study in Ukanda, Kenya examined the value that households assign to time spent collecting water.² By providing a choice of two water sources and identifying two decision factors, the price of the water and the time required, revealed preference analysis found that the value assigned to time saved due to improved water supply is much higher than previously believed.

A study of the private sector water vending system in Onitsha, Nigeria, demonstrated that households' willingness to pay for quality service may be surprisingly high.³ There, the quality of service from the local water authority was perceived to be low, and most people purchased water from private vendors. To compete, therefore, the local authority must not only provide more affordable rates but provide a better product in terms of quality and reliability.

A 1995 study of Baroda, India, is one of the few such studies to focus on urban areas in India.⁴ This study found that:

- * About 85% of households without household connection expressed willingness to pay for improved standpost service.
- * Among households with individual connections, about 63% were found to be willing to pay for better pressure, and 11% for better quality. Nearly 80% of those with household connections were willing to pay more even if service was not improved, as much as three times the current municipal rate.
- * Approximately 58% of households were willing to pay a one time connection charge.
- * The percentage of income households were willing to pay for water declined as incomes increase, though WTP for the highest income group was only 60% higher than that of the lowest income group. This suggests limited scope for cross-subsidization of water supply across income groups.

be very low, while for domestic users, especially the low-income, price will have a significant impact on consumption.

Feasibility of Varying Connection Charges. This will depend on past pricing practices, local administrative arrangements for pricing and cost recovery, administrative jurisdictions of authorities and political acceptability of varying rates.

The Nature of Demand. This varies in terms of quantity, quality and reliability; for example, industrial users may be bulk consumers with low quality requirements, in contrast with domestic consumers.

Ability and Willingness-to-Pay for Services. This is essential for price-setting both across and within user groups.

2. Conduct a Rapid Demand Assessment for Each Consumer Group. Demand for urban environmental services is far more complex than a typical consumption commodity, and the following dimensions should be explored.

Level of Consumption: the quantity consumed through the connection or waste disposed of through a service

Access: the user decision to locate in an area where service is available or to pay for laying of a distribution/collection network

Connection: user decision to connect to a network and the type and size of connection taken

The assessment should address user preference and willingness to pay in relation to each dimension of demand. To determine what the markets will bear, it is necessary to identify a range of prices for each user group across the relevant dimensions of demand. For example, in an unserved peripheral area, WTP may be assessed for access (a development charge), connection to the system (a one-time fee) and consumption (possibly metered charges). For domestic low-income user groups in particular, maximum affordable rates for ensuring lifeline services should also be identified.

In many Indian cities, private markets for urban services have emerged either because public services have been absent or their quality and reliability are poor. The demand assessment must include a reconnaissance survey to identify prices being charged by the private operators to different customers.

At this pre-feasibility stage, a simple bid game may be used in reconnaissance surveys as well as focus groups and discussions with users. For a sample bid game questionnaire, see Box 2.

3. Develop Detailed Tariff Categories. Detailed tariff categories can be developed which reflect the types of charges which can be levied on different service groups.

Box 2: Sample Bid Game Questionnaire

1. Would you be willing to pay Rs. 25 per month for 1 kilolitre of public water?

If so, proceed to #2. If not, proceed to #5.

2. Would you be willing to pay Rs. 50 per month for 1 kilolitre of public water?

If so, proceed to #3. If not, proceed to #5.

3. Would you be willing to pay Rs. 100 per month for 1 kilolitre of public water?

If so, proceed to #4. If not, proceed to #5.

4. Would you be willing to pay Rs. 200 per month for 1 kilolitre of public water?

5. What is the maximum number of rupees per month you would be willing to pay for 1 kilolitre of public water?

Source: Adapted from WASH Project Field Report No. 316, USAID

Though a wide variety of charges may be levied, most service authorities do not adequately tap this potential in a meaningful manner. Tariff categories will depend to a great extent on the existing and past tariff charges, the complexity of the system, and the administrative and management capacity of the utility authority to determine appropriate charges and to conduct billing and cost recovery in an efficient manner.

4. Make Initial Demand Forecasts. Estimation of the likely growth in the number of connections and consumption for each user group can be done by collating growth trends with project provisions, through the following steps.

Estimation of Connections: across user groups over project life based on past growth rates, augmentation or extension of distribution networks, facility standards, capacity utilization and agency capability

Setting Service Levels: quantity across user groups based on existing service levels, number of connections and available capacity

Estimating Total Consumption and Production Requirements: for each user group, including a share of unaccounted-for water

Estimating Quantities across Tariff Categories: total connections, quantity of water, new connections, and

total annual ratable value; allows for revenue forecasts

5. Initial Tariff Setting and Demand Adjustment.

Initial tariff proposals for each user category can be identified based on the market assessment, WTP of different user groups and proposed service improvements. The feasibility of each proposal must be tested in terms of political implications, affordability, existing price levels and past revisions.

Based on these proposals, it must be determined whether tariff changes will have an impact upon demand. Consumption forecasts will be adjusted based on the price elasticity of demand. While price elasticity estimates should be worked out for a detailed market assessment, notional adjustment for important user groups can be made based on judgment.

ENDNOTES

¹ Sing, B., Ramasubbrao, R. and others (1993). "Rural Water Supply in Kerala, India — How to Emerge from a Low Equilibrium Trap," *Water Resources Research*, Volume 29, No. 7, pp 1931-1942.

² Whittington, D., Xinming, M. and Robert, R. (1990), "Calculating the Value of Time Spent Collecting Water — Some Estimates for Ukanda, Kenya," *World Development*, Volume 18, No. 2, pp 226-280.

³ Whittington, D. and Lauria, X. (1991). "A Study of Water Vending and Willingness to Pay for Water in Onitsha, Nigeria," *World Development*, Volume 19, No. 2, pp 179-198.

⁴ Vaidya, C. (1995). "Willingness to Pay for Water Supply and Sewerage in Baroda," Research Study sponsored by the Human Settlements Management Institute, HUDCO, New Delhi.

~~~~~

*This Project Note is based on two FIRE Project Technical Reports: "Pre-Feasibility Analysis and Report Formats, Volume 2: Stage II" by Meera Mehta and V. Satyanarayana, and "Willingness to Pay for Water and Sanitation: Baroda, India Case Study and Guidelines for Future Studies" by Chetan Vaidya.*

## Indo-US Financial Institutions Reform and Expansion Project - Debt Market Component FIRE(D)

The objective of the Indo-US Financial Institutions Reform and Expansion (FIRE) Project, funded by the U.S. Agency for International Development (USAID), is to support the Government of India in its efforts to strengthen domestic capital markets to enable them to serve as efficient source of development finance. The Debt Market/Infrastructure Component (FIRE-D) pursues this goal through the development and financing of commercially viable urban environmental infrastructure projects; by channeling USAID Housing Guaranty funds to selected demonstration cities and states; and through policy advocacy, management support, technical assistance, training and research.

The FIRE (D) Project Office

E-3/4, Vasant Vihar

New Delhi 110 057, India

Tel: (91-11) 614-3551 or 614-9836

Fax: (91-11) 614-1420 or 614-4480

Regional Urban Development Office

USAID/New Delhi

B-28 Institutional Area

New Mehrauli Road, Near Qutab Hotel

New Delhi 110-016, India

Community Consulting International

1012 N Street, NW

Washington DC 20001-4297 USA

*in association with*

Technical Support Services

1012 N Street, NW

Washington DC 20001-4297 USA

Funded under USAID Contract

No. 386-0531-C-00-5027-00

The *Project Notes* series is edited and produced by Laurie de Freese